February 3, 1967

Dear Dick:

The enclosed report briefly outlines the proposed work on the System Parameters Study. The report defines the areas that require co-ordination of efforts between the two facilities and the materials desired.

If possible, I would like to visit with you on 15 February to discuss what might be done to obtain edge gradient measurements and also to review the performance reports. It is not necessary to have the required step tablets at that time, but I would like to obtain these step tablets and corresponding data by 20 February.

I'll be getting in touch with you shortly.

Thank you,

Bill

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SUMMARY OF SYSTEM PARAMETERS STUDY EFFORTS

General

The sole intent of this task is to establish an objective measure of the photographic parameters and film properties associated with system performance. These parameter and property measures, as listed below, will be used as a guide to describe and specify the photographic quality to which to generate GEMS.

It is understood that some, if not most, of the parameters have been measured in some manner and that this data exist in report form. These reports will be reviewed to obtain the pertinent information related to the task objectives. Data, not available in report form or more appropriately defined in terms of program equipment, will be obtained with the co-operation of the customer.

Parameters to be Studied

The various system parameters and film properties to be defined are:

(1) Scene contrast
(2) System exposure range
(3) Film granularity
(4) Film density neutrality
(5) Tonal scale
(6) System modulation transfer function

The above parameters and properties are the items most significantly influencing the visual appearance of the GEMS and the mission material. Realistic simulations are only achieved by matching each system parameter and film property.

Means of Obtaining Objective Measures

It will be necessary to acquire a minimum of four (4) step tablets which have been processed under normal conditions. These step tablets will be used to evaluate tonal scale, film density neutrality, and film granularity. The step tablets should be accompanied by a sensitometer density step value listing.

In addition to measuring the step tablets to obtain sensitometric data, one step tablet shall be scanned on a spectrophotometer for a measure of density neutrality; while a second step tablet shall be scanned on a micro-densitometer to obtain granularity values at approximately 0.4, 0.9, 1.6, and 2.3 net density units. The above measurements shall be made on [redacted] facility equipment in order to avoid standardization of measurement techniques between facilities. STAT

The parameters of contrast, exposure, and resolution are to be defined from existing report information. For the contrast and exposure parameters, it is assumed that various frames of mission material have been scanned to obtain density measurements and that these measurements are correlated with format position. If the above assumption is true, a measure of scene contrast will be obtained by noting the maximum and minimum density values from specific format locations. The system exposure range will be obtained by referring the scene maximum and minimum density values to the ground exposure domain.

The reports also will be reviewed for information pertaining to measures of resolution and image quality. If possible, a few good photographic edges will be scanned on a microddensitometer to obtain a measure of the system's modulation transfer function by means of the Edge Gradient Analysis Technique.

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Desired Materials

In order to perform the study described herein, it will be essential t gather the materials defined below:

(1) Four step tablets representative of normal processing conditions along with a listing of sensitometer density values that produced these step tablets.

(2) Approximately five of the latest system performance reports, containing the information desired, will be reviewed at the customer's facility. The reports to be reviewed should be those of a good or successful mission.

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(3) Approximately four high quality mission material frames with suitable edges to be scanned. The frames are to be accompanied by a sensitometric step tablet from the same roll of film.

A visit shall be made to the customer's facility in the near future. The purpose of this visit will be to review the performance reports; and to discuss with the customer, possible means of obtaining the edge measurements desired.

Mag. range need on O/N 30X - 100X } for psychophysical Study

equipment mag range 7X tube — 1860X

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① MTF (6 to 10) # of edges on 4 frames (2 frames each from 2 missions) along with a step tablet.

② measure of Exposure and Contrast:

Random scanning of a few frame areas specified.